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COMMENTS

TREATMENT TO COUNTERACT ALGAE GROWTHS IN LARGE RESERVOIRS

The minute plant growths that develop from time to time in waters that are exposed to the light represent a troublesome problem to the water works operator who is responsible for the palatability of the supply furnished to his community. The use of copper sulphate to destroy such growths is well recognized in the water supply art, but its application has, so far as the writer knows, been limited to comparatively small bodies of water, such as distribution reservoirs and relatively small collection and storage reservoirs, or else to the shallower areas of large reservoirs. The problem of destroying such growths in reservoirs holding many billions of gallons of water is one which it is believed has not been previously solved, and about which there are few or no data available. A description of some recent experiments in this line, undertaken in connection with the Catskill water supply of the city of New York will be briefly set forth, in the hope that such experience may be of some benefit to others, and may also bring forth other experiences which may be pertinent to this subject.

During the two years that the Catskill system has been utilized to supply about three-fifths of the total water consumed in the city of New York, there has been anxiety over the possibility of

microscopic algae growths simultaneously appearing in both the Ashokan and the Kensico reservoirs in sufficient numbers to noticeably and disagreeably affect the taste and odor of the water delivered to the consumer. Up to December, 1919, there had been no such simultaneous growth, although an uncomfortably narrow margin of time had separated in the past the dying out of a growth in one reservoir and the development of a growth in the other reservoir. Before the Catskill supply had been introduced, an unsuccessful experiment had been tried in the Croton aqueduct, by treating the waters from Croton lake with a solution of copper sulphate, to determine whether such treatment would destroy these growths, and it therefore appeared doubtful whether copper sulphate treatment could effectively be applied to water flowing through a long aqueduct.

In December conditions developed in the Catskill supply which made it necessary to do whatever seemed to offer even a remote chance of success in killing the algae growth. In the Kensico reservoir asterionella had developed in all parts of the reservoir to an extent of over 2000 units per cubic centimeter. In the Ashokan reservoir the growth of asterionella had reached in both basins an equal or greater number of units. This number of asterionella is sufficient to cause a disagreeable geranium taste and odor, which is most noticeable in the hot water. At this time ice was forming in the Kensico reservoir, and it was decided to treat that reservoir as quickly as possible with as much copper sulphate as could be gotten into solution.

The reservoir has an irregular shape, and there is a distance of about 3 miles between the point where the flow from Ashokan enters the reservoir and the point where the water is drawn out to be delivered to the city. The reservoir at this time was substantially full, and held above the aqueduct level about 29,000,000,000 gallons. It was estimated that if 6000 pounds of copper sulphate were used we could treat with a strength of about one part to five million in weight the waters in that portion of the reservoir which lay between the influx chamber and the efflux chamber, extending to a line approximately half way between the side of the reservoir on which both the influx and efflux chambers are located and the opposite side of the reservoir. This work was immediately undertaken but the rapid formation of ice stopped the work when approximately 5000 pounds of copper sulphate had been added. To

prevent further seeding of the reservoir with algae growth, and to still further reduce if possible the growth already in the reservoir, it was decided to experiment with treating the flow in the aqueduct by continuously introducing copper sulphate in the proportion of one part to five million by weight, the chemical to be introduced at the alum treatment plant, which is located about an hour's flow upstream from the influx chamber at the Kensico reservoir. A mechanical feeding device installed at this alum plant permitted a very close regulation of the rate of feed of the copper sulphate. The treatment was started, using about 625 pounds per twenty-four hours, the flow through the aqueduct being uniformly maintained at very close to 380,000,000 gallons daily. This treatment has now been continued for three weeks, and the results obtained are interesting, although not considered conclusive as yet.

The treatment of the water in the reservoir resulted in an irregular change in the number of units that appeared in the supply as drawn from the reservoir. This supply is passed through the aerator, and the sample taken after the water had passed through the aerator and through Hillview reservoir, which contains about three days' supply, showed that the organism had lost its virility, many of the units appearing to be mere shells, and almost no complaint has been registered on account of taste and odor from the organism, although frequently there have been as many as 2000 to 3000 units per cubic centimeter. The treatment of the flow through the aqueduct shows very little change in the number of organisms at the point where the water is discharged into the reservoir, but samples taken at points ½ mile apart and extending 2 miles down the reservoir, indicated that the growth has been substantially eliminated through this treatment. The appearance of the organism as it enters the reservoir also tends to corroborate the conclusion that the treatment has been effective.

In samples taken during the week ending January 17, 1920, the number of organisms at the point where water enters the reservoir was 1350; at a point ½ mile below the intake, 1400; 1 mile, 115; 1½ miles, 1925; 2 miles, 1825. These figures indicate that the treatment of the inflow to the reservoir has been felt for a distance of a mile from the influx chamber, this being about the distance that we would expect the flow from the aqueduct to extend during the three weeks' period of treatment.

The cost of this treatment is about $50 a day and is a negligible amount when it is divided by the number of million gallons treated, as the resultant cost per million gallons is about 13 cents.

The writer again requests that others who may have had experience with treatment of large bodies of water for the destruction of algae growths, will communicate with the Editor of the JOURNAL, setting forth such experience for the benefit of all interested.

WM. W. BRUSH.

IN UNION IS STRENGTH

One of the features of the Iowa Section of our Association is its interest in the larger problems of water works administration and the effect of state legislation on water supplies. At the recent meeting in Mason City, for instance, a legislative committee was appointed after a full discussion of desirable changes in the statutes relating to water works, to present these reforms to the Iowa Code Commission. This is a commission appointed by the last general assembly to revise the State Code by eliminating obsolete laws and harmonizing those which conflict more or less. The Commission is not to go into salaries or budget, it is understood, but solely into the revision of the statutes.

The sessions of this commission afford an unusual opportunity for improving the legislation affecting the work of the Iowa Section members and advantage is being taken of them. Already Messrs. Shoemaker, Carlin and McEvoy, with the writer, have appeared before the commission and other meetings will be held, it is expected. At the first meeting the following topics were presented informally:

1. A proposal to require the metering of all water supplied by municipally owned water plants to public buildings, parks, water fountains, bathing beaches, garbage dumps, disposal plants and other public users of water, with the provision that such water now commonly supplied without charge be paid for by the city at actual operation costs, excluding cost of extensions from the calculations. The charge for each year is to be based upon the actual cost of water during the preceding year.

2. A proposal to make mandatory the levying of a millage tax by the city council for the support of the municipal water plant upon receiving certification of necessity from the governing board of the plant.